



reprinted from

the *Missouri Conservationist*

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Missouri's Toads and Frogs

MISSOURI TOADS AND FROGS are colorful, harmless, vocal and valuable. Our forests, prairies, rivers, swamps and marshes are home to a multitude of toads and frogs, but few people know how many varieties we have, how to tell them apart, or much about their natural history. Studying these animals and sharing their stories with fellow Missourians is one of the most pleasurable and rewarding aspects of my work.

Toads and frogs are amphibians—a class of vertebrate animals that also includes salamanders and the tropical caecilians, which are long, slender, wormlike and legless. Missouri has 25 species and subspecies (or geographic races) of toads and frogs. Toads and frogs differ from

salamanders by having relatively short bodies and lacking tails at adulthood. Being an amphibian means that they live two lives: an aquatic larval (tadpole) stage and a semi-aquatic or terrestrial adult stage. Of the 3,260 species of amphibians currently recognized in the world, there are approximately 2,770 species of toads and frogs. The largest species is the Goliath frog, *Rana goliath* of the west coast of Africa which may have a body length of nearly 14 inches and may weigh as much as five pounds. One of the world's smallest frogs is *Sminthillus limbalus* which has no common name and lives in the tropical forests of Cuba. It is only a half-inch long. This frog is so tiny that females of the species are able to produce only one egg during the breeding season.

One often-asked question is: "What are the differences between toads and frogs?" While they are more similar than different, there are some basic distinctions. Toads have dry, warty skin, while frogs have smooth, wet skin. Toads do not have teeth; frogs have tiny teeth on both upper and lower jaws. Toads have shorter hind legs than most frogs. Toads hop, frogs jump. Female toads lay their eggs in long, parallel strings; female frogs—depending on the species—lay their eggs singly, in small clumps, in large clumps, or as a film of eggs on the water surface.

Although most people would be hard-pressed to identify a variety of toads and frogs by the sounds they make, people generally are aware of the fact that these animals have voices and are interesting to listen to. A male toad or frog produces his call by a rapid back-and-forth movement of air over his vocal cords. When calling, a toad or frog will close its mouth and nasal openings and force air from its lungs over the vocal cords into the mouth cavity, then back over the vocal cords and into the lungs. Producing a sound in this "closed system" enables some anurans (toads and frogs) to vocalize under water. These animals use an enlarged throat or expandable vocal sac to resonate their calls.

All Missouri toads and frogs must return to a body of water to reproduce. Most of our species breed during the spring or early summer, but southern leopard frogs, *Rana sphenoccephala*, are known to breed during rainy periods in the fall. The majority of these amphibians select fishless bodies of water in which to breed. Flooded fields, ditches, small woodland ponds, prairie ponds and water-filled depressions are favorite places. A few hardy, adventurous males locate an appropriate breeding pond when the temperature and humidity are suitable, and begin to call. Each species of toad or frog has a distinct breeding call which entices females to join them and select a mate. Soon, other males congregate and add their voices to the chorus. Females, heavy with eggs, enter the pond, are grasped by a male in an embrace called amplexus, and begin the process



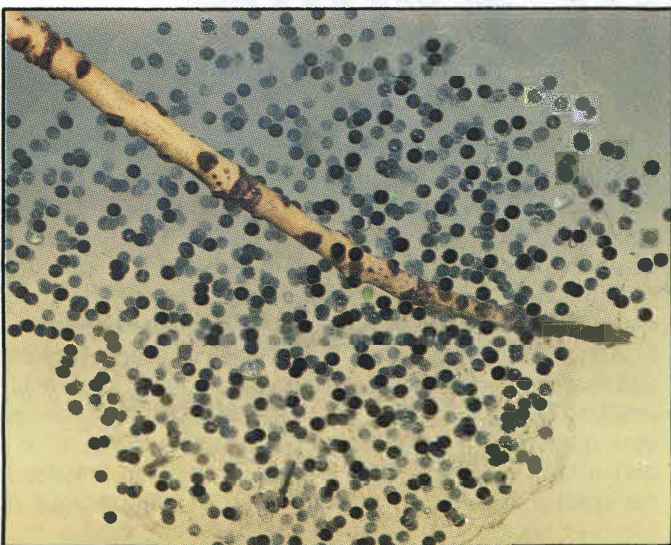
Some tadpoles are beautifully colored (eastern gray treefrog).

of egg-laying. During egg-laying, the males's vent opening is positioned just above the female's vent, and as her eggs are released, the male fertilizes them with his milt. He will retain his firm grip on her until all the eggs have been laid.

Most anuran eggs hatch within 10 days of being laid, but they may hatch much sooner if the water temperature is above 21 degrees Celsius (70 degrees Fahrenheit). The tiny, newly hatched tadpoles rest for a few days by clinging to aquatic plants, receiving nourishment from the last of the yolk sac stored in their bellies. Tadpoles of most of our species eat aquatic plants—especially algae—as they develop in the pond. Tadpoles have gills, somewhat like fish, which are covered and protected by a flap of skin. As development progresses, the hind legs form and enlarge. The tail begins to shrink at this stage. As the front legs appear, the tail continues to become smaller. Soon the gills are lost, and the late-stage tadpole begins to breathe air at the surface, using brand-new lungs. The final stage of development from a tadpole to a young frog, known as a froglet, is the combination of the disappearance of the tail and the change from a life under water to a life on land or along the edge of a pond or swamp. Soon after transforming from tadpoles to froglets or toadlets, these young amphibians begin eating insects, small spiders and worms. They grow quickly.

Toads and frogs defend themselves in several ways. Most of their enemies are predators such as fish, turtles, snakes, birds and carnivorous mammals—shrews, mink, skunks and raccoons. Our larger species of frogs will also eat other frogs. Toads cannot jump as fast as frogs to escape a predator and defend themselves by producing toxic or unpleasant-tasting skin secretions which are released when the animal is seized. Due to their bad flavor, toads are not a popular food among predators. Even their eggs and tadpoles are said to be toxic. Frogs also have skin glands which cause them to have a bad flavor, but the

An egg mass from the wood frog.





Eastern gray treefrog calling.

secretions are not generally as strong as those of toads, and so frogs are eaten by a much wider variety of predators. People normally are not affected by the skin secretions of toads and frogs, although human eyes are sensitive to these substances. The pain and burning that result when even a slight amount of anuran skin secretion gets in one of your eyes is something you will never forget. It is important to wash your hands after handling a toad or frog. The age-old myth that toads can cause warts on people is false.

The toads and frogs native to Missouri are a valuable part of our outdoor heritage. Most people probably don't give them much thought, but we need these amphibians to control destructive insects and to add their voices to the sounds of spring and summer. Just hearing or seeing them adds to our enjoyment of the Missouri outdoors. Their role in nature can be illustrated by the huge number of insects they eat and by the number of animals that eat toads, frogs or their tadpoles. And, a discussion of the value of frogs should include the fact that literally thousands of bullfrogs are harvested in our state each year for human consumption—one of Missouri's truly gourmet outdoor foods.



Plains Spadefoot Toad *Scaphiopus bombifrons*

This is a small species with large, protruding eyes. The pupils of their eyes are vertical and elliptical. The general coloration ranges from gray to brown, and there may be some green on the sides. The small, irregular blotches on the back and legs are dark brown and may encircle the majority of warts. The hind legs are short, and the underside of each hind foot has a distinct, wedge-shaped tpade. This toad is from 1½ to 2 inches (38 to 51 mm) in body length. The species is at home on the Great Plains, where it inhabits prairies and open-river flood plains. It hides in burrows in sandy soil and becomes active at night, especially after heavy summer rains. The plains spadefoot toad eats a variety of insects. Breeding takes place during April and May. Their voice is a long, rasping, nasal *garvank*.

Missouri Distribution: May be found on the Missouri River flood plain from the northwestern corner of the state to St. Louis County.

Plains Spadefoot Toad



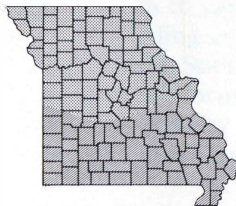
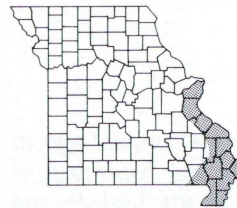


Eastern Spadefoot Toad

Eastern Spadefoot Toad *Scaphiopus holbrooki holbrooki*

This is a stout, toadlike amphibian with large, protruding eyes, vertically elliptical pupils, short legs and large feet. The inner surface of each hind foot has a sickle-shaped spur or spade. Coloration is light brown to yellow-brown. The head, back and upper parts of the legs are mottled with dark brown. There are usually two or three light yellow-brown stripes along the back. The belly is pale gray. The eastern spadefoot toad may be from 1 ¾ to 2 ¼ inches (44 to 57 mm) in body length. This toad prefers open areas with sandy or loose soil in association with river flood plains. It breeds in temporarily flooded fields or ditches during warm, rainy weather in late spring or summer. The call is a quick series of coarse *wank, wank, wank* sounds. This secretive, burrowing species eats a variety of insects.

Missouri Distribution: Found in eastern and south-eastern sections of the state.



American Toad *Bufo americanus americanus*

This is Missouri's most common toad. The American toad is medium-sized and has a large, kidney-shaped gland called the parotoid gland behind each eye. The pupil of each eye is horizontal. Coloration may be gray, light brown, or reddish-brown. The dark spots on the back may encircle from one to three warts. The belly is cream-colored and mottled with dark gray. This species averages from 2 to 3 ½ inches (51 to 89 mm) in body length. Females generally are larger than males. American toads select woodland ponds or water-filled ditches for breeding, which occurs during April and early May. The call is a sustained, high-pitched musical trill. This species eats earthworms and a wide variety of insects.

Missouri Distribution: The American toad is found throughout the northern half of the state, but intergrades with, and is replaced by the dwarf American toad (a subspecies or geographic race) in the southern half of the state.

American Toad



Fowler's Toad

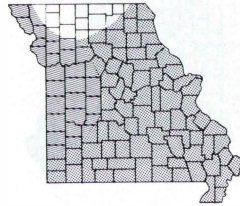
Bufo woodhousei fowleri

A common toad of lowlands, this species may have a ground color of gray, greenish-gray, tan or brown. The dark markings on the back normally encircle three or more warts. There is often a thin, white stripe down the back. The belly is cream-colored, and there may be a dark gray "chest spot." Fowler's toads range in body length from 2½ to 4 inches (60 to 100 mm). This species may be found in river flood plains where the soil is sandy, and it is the toad often found on river sand or gravel bars. As with other toads, this amphibian remains hidden in burrows by day, becoming active at night to hunt for insects. Fowler's toads breed later in the season than American toads—from late April to the end of May. The call is a short, nasal *w-a-a-h*, lasting from 1 to 2½ seconds.

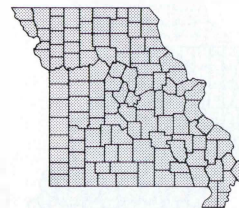
Missouri Distribution: Found over most of the eastern and southern parts of Missouri, intergrades with and is replaced by a subspecies called the Woodhouse's toad, *Bufo woodhousei woodhousei*, in the western part of the state.



Fowler's Toad



Blanchard's Cricket Frog



Blanchard's Cricket Frog

Acris crepitans blanchardi

This small frog is a member of the treefrog family (Hylidae) but is a non-climber and lacks the adhesive toe pads associated with treefrogs. Coloration is quite variable—gray, tan, greenish-tan or brown. The back may have a green, yellow, orange or brown stripe. There is always a dark triangle between the eyes. This warty frog averages from ⅝ to 1½ inches (16 to 38 mm) in body length. Cricket frogs are most commonly seen along the edges of ponds and rivers, especially on mud flats and gravel bars. This species avoids an enemy by a series of quick, erratic hops. Blanchard's cricket frogs breed from late May to early July, at which time their metallic *gick, gick, gick* may be heard.

Missouri Distribution: Presumed to occur statewide.

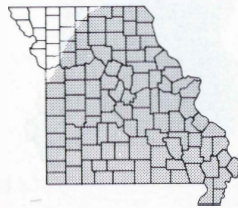
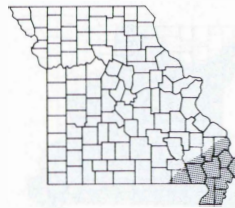


Green Treefrog

Green Treefrog
Hyla cinerea

A bright green frog of southeastern Missouri. Coloration is normally light green, but during cool weather it may be dark green. There is always a yellow line running from the upper lip down along the sides. Some yellow spots may also be present on the back. The belly is white or yellowish. Distinct round, adhesive pads are found on all digits. Green treefrogs average from 1 ¼ to 2 ¼ inches (32 to 57 mm) in body length. This attractive frog lives in the last remaining cypress swamps, sloughs and oxbow lakes of southeastern Missouri. They hide in green leaves during the day and become active at night when they search for insect prey. This treefrog breeds during the summer, and its call is a noticeable part of the nighttime sounds of our cypress swamps. The call is a series of measured, nasal *quank, quank, quank* sounds, which is normally not heard until after sundown.

Missouri Distribution: Green treefrogs occur in the Mississippi lowlands of the Missouri Bootheel.



Northern Spring Peeper
Hyla crucifer crucifer

A small, pinkish, gray or light tan treefrog with a dark X-mark on the back. This species has reduced adhesive toe pads, and spends most of the time on the forest floor or in low shrubbery. Spring peepers average from ¾ to 1 ¼ inches (19 to 32 mm) in body length. This is a woodland species, living near ponds, streams or swamps where there is thick undergrowth. Spring peepers are active from early spring to late fall, but breed early. Their voices are a true announcement of spring. Small, fishless woodland ponds are required by this amphibian. Their high-pitched, peeping call can be heard on warm spring nights and also during the day in early summer and fall.

Missouri Distribution: Nearly statewide but absent from the northwestern corner of the state.

Northern Spring Peeper

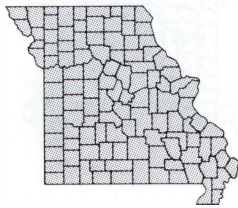


Gray Treefrog

Hyla chrysoscelis and *Hyla versicolor*

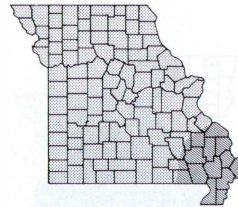
Gray treefrogs are Missouri's most common species of treefrog. Their color may be gray, greenish-gray or brown. Bright green specimens are often seen. There is always a large, white marking below each eye. The inside of each hind leg is washed with yellow-orange. Large, adhesive toe pads are present on fingers and toes. Two species of gray treefrogs occur in Missouri: Cope's gray treefrog, *Hyla chrysoscelis*, and the eastern gray treefrog, *H. versicolor*. These two species are nearly identical in appearance and are best separated by their calls. Cope's gray treefrog sounds like a buzzer, while the eastern gray treefrog has a birdlike, musical trill. These forest-dwelling species breed in late May and early June in fishless woodland ponds. Gray treefrogs average from 1 ¼ to 2 inches (32 to 51 mm) in body length.

Missouri Distribution: These two species of gray treefrogs have a composite statewide distribution.



Gray Treefrog

Western Chorus Frog



Western Chorus Frog

Pseudacris triseriata triseriata

A small, secretive frog of grasslands, meadows and forest edges. Coloration may be gray or tan with three wide, dark stripes or a series of spots down the back and a wide, dark brown stripe on the sides. The belly is white. This species may be from ¾ to 1 ½ inches (13 to 38 mm) in body length. Western chorus frogs are seldom seen and spend most of the summer underground in animal burrows or in clumps of grass. This small species breeds in early spring in temporarily flooded fields and ditches. Their call is a rasping, vibrating *prreeep*.

Missouri Distribution: The western chorus frog occurs over most of the state. It intergrades with and is replaced by the upland chorus frog, *Pseudacris triseriata feriarum*, a subspecies, in southeastern Missouri.

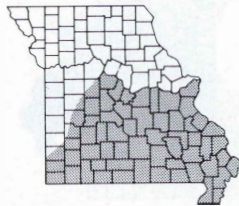


Illinois Chorus Frog

Illinois Chorus Frog
Pseudacris streckeri illinoensis

This member of the treefrog family acts more like a toad. Most of its life is spent underground in sandy soil. General color may be tan or gray, with dark brown or gray markings. A V-shaped mark between the eyes and a dark spot below each eye are important characteristics. This small, burrowing chorus frog has large, muscular forelegs which are used for digging. Illinois chorus frogs average from 1 to 1 $\frac{5}{8}$ inches (25 to 41 mm) in body length. This species lives in river flood plains where there is sandy soil. It breeds in early spring, at which time its high-pitched, birdlike whistle can be heard.

Missouri Distribution: This frog is restricted to the Mississippi lowlands of the Missouri Bootheel.

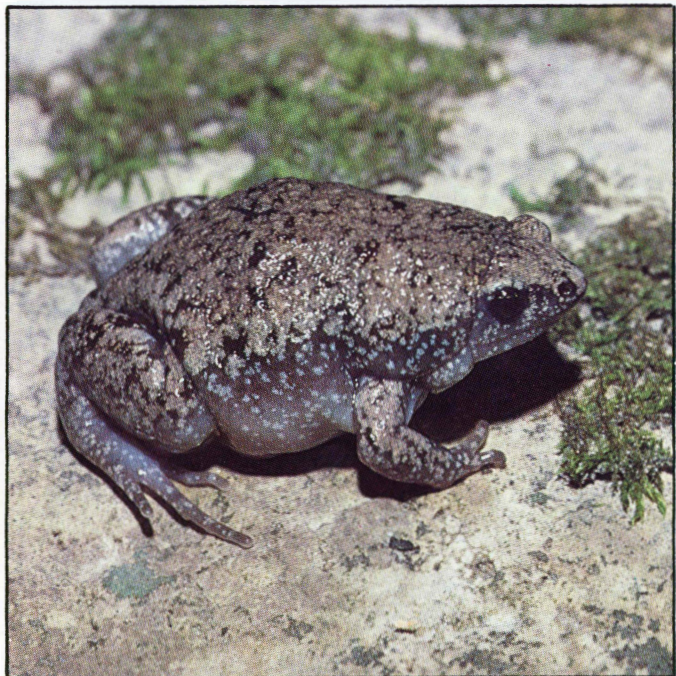


Eastern Narrowmouth Toad
Gastrophryne carolinensis

The eastern narrowmouth toad is an unusual little amphibian which is seldom seen. It lives under flat rocks or other objects in dry woodlands or near some river flood plains. It is tan or gray in color with a dark, wedge-shaped marking on the back and a wide, dark stripe on each side. There is a fold of skin behind its narrow, pointed head. Eastern narrowmouth toads average from $\frac{7}{8}$ to 1 inch (22 to 32 mm) in body length. The food of this species consists mostly of ants. Breeding takes place in May and June, and its call is a bleating, nasal *baaaa*, which sounds like a lamb. This species may be found under rocks on glades or under logs along large-river flood plains.

Missouri Distribution: Occurs throughout most of the southern half of the state.

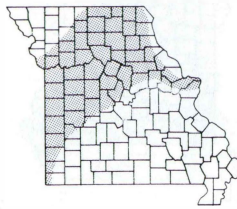
Eastern Narrowmouth Toad



Northern Crayfish Frog
Rana areolata circulosa

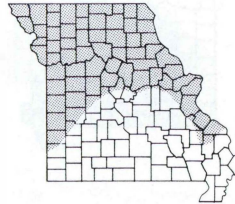
This is Missouri's second largest species of frog. Northern crayfish frogs live in prairies near small creeks or marshes. Coloration is tan or light gray, with numerous brown or black spots. There is a faint ridge of raised skin along each side of the back. Northern crayfish frogs range from 2½ to 4 inches (65 to 104 mm) in body length. This species is seldom seen because of its secretive nature. Crayfish frogs take shelter in crayfish burrows or other animal burrows. This prairie species eats a variety of insects and small crayfish. Breeding takes place in early spring after heavy rains. Fishless ponds are selected as breeding sites, and the deep, loud, snoring *gwaa* can be heard from a considerable distance.

Missouri Distribution: Occurs in northern, central and western sections of the state.



Northern Crayfish Frog

Plains Leopard Frog



Plains Leopard Frog
Rana blairi

A medium-sized spotted frog of pastures, prairies and marshes. The general color is tan, and the round spots on the back and sides may be brown, olive or dark green. The ridge of skin along each side of the back is broken, and the small posterior section is raised toward the back. Plains leopard frogs average from 2 to 3¾ inches (51 to 95 mm) in body length. This species breeds during late spring in small ponds, marshes or flooded fields. The voice is a rapid series of guttural *chuck-chuck-chuck* sounds.

Missouri Distribution: Plains leopard frogs occur in western, northern and eastern Missouri.



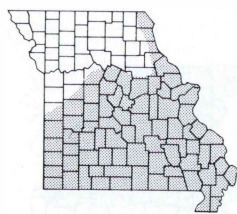
Southern Leopard Frog

Southern Leopard Frog

Rana sphenocephala

Sometimes called the grass frog, this species can be told from the plains leopard frog by the presence of green on the back, the more elongated and fewer dark spots on the back, a more elongated snout and a continuous ridge of skin down each side of the back. Southern leopard frogs average from 2 to 3½ inches (51 to 89 mm) in body length. This common frog breeds in early spring and uses a variety of habitats: water-filled ditches, ponds, sloughs, lakes, swamps and marshes. The call of this species is a series of abrupt, chucklelike *quack* sounds. Each female may produce from 3,000 to 5,000 eggs.

Missouri Distribution: The Southern leopard frog occurs nearly statewide.



Pickerel Frog

Rana palustris

This is a medium-sized frog with a tan ground color, square or rectangular-shaped markings in two parallel rows down the back, and with a wash of yellow along the underside of the hind legs. There is a wide ridge of skin along each side of the back. Pickerel frogs average from 1¾ to 3 inches (44 to 76 mm) in body length. This attractive frog may be found in wet caves, along well-shaded springs and creeks and in damp woods. Breeding takes place during the spring in fishless, woodland ponds. The breeding call is a continued, low-pitched snore.

Missouri Distribution: Pickerel frogs occur throughout the southern half and the eastern edge of the state.

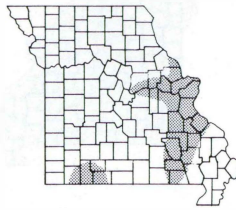
Pickerel Frog



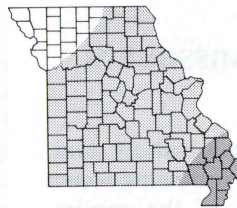
Wood Frog
Rana sylvatica

This is a tan, pinkish-tan or brown frog with a dark brown mask through the eye and ear. A thin ridge of skin is present along each side of the back. Wood frogs average from 1½ to 2½ inches (45 to 63 mm) in body length. In Missouri, this species lives in cool, forested ravines where small, fishless ponds are available for early spring breeding. The voice is a quick series of *waaaddick* sounds. This species has been listed as endangered in Missouri, but due to new information on natural history and distribution, the status will soon be changed to rare.

Missouri Distribution: Wood frogs occur in scattered colonies in eastern, southeastern and southwestern sections of the state.



Wood Frog



Green Frog



Green Frog
Rana clamitans melanota

This species looks similar to the bullfrog but is smaller and has a ridge of skin along the sides of the back that is not found on bullfrogs. General coloration may be greenish-brown or brown, and the legs may have distinct dark spots or bars. The upper lip and parts of the head are often bright green. Adult males have a bright yellow throat. Green frogs average 2¼ to 3½ inches (57 to 89 mm) in body length. In the Ozarks, green frogs live along rocky creeks and in sloughs and woodland ponds. In northern Missouri, the species occurs in farm ponds and marshes. Breeding takes place in late May through June. Their call is an explosive *bong*. This is a game species; check the Missouri Wildlife Code for current seasons and bag limit.

Missouri Distribution: Nearly statewide, intergrades with and is replaced by the bronze frog (*Rana clamitans clamitans*) in the Bootheel.

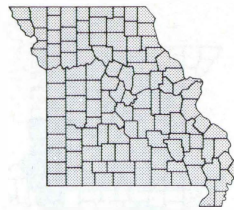


Bullfrog

Bullfrog
Rana catesbeiana

This is Missouri's largest frog. General coloration ranges from green to olive to brown. The hind legs may be heavily marked with dark brown bars. Bullfrogs lack the two ridges of skin along the sides of the back found on the other *Rana* species. Bullfrogs average from 3½ to 6 inches (90 to 150 mm) in body length. This large frog lives in a variety of aquatic habitats: swamps, marshes, sloughs, lakes, ponds, rivers and creeks. Bullfrogs eat insects, crayfish, frogs, small fish and other small animals. Male bullfrogs produce their familiar "jug-o'-rum" calls throughout the summer. This is a game species; check the Missouri Wildlife Code for current seasons and bag limit.

Missouri Distribution: Statewide.



**TOADS AND FROGS—A PART OF MISSOURI'S
OUTDOOR HERITAGE**

Landowners who wish to encourage a variety and abundance of toads and frogs can do so by following some simple land-management practices. Most of the species native to Missouri breed in fishless ponds or temporary pools. Landowners may not think these small water holes are valuable, but, in fact, a dozen or more species of amphibians may use them as breeding ponds. Small brush piles placed in the water near the pond edge, as well as near the pond, provide good hiding places for young toads and frogs as they leave the pond. Placing dead tree branches in shallow water will provide places for female frogs to attach their egg masses. Fencing the pond from cattle will protect the water quality and allow the growth of a more diverse plant community which will provide cover and insects. Insecticides and other pesticides should be kept away from any frog ponds because their eggs and tadpoles are highly sensitive to these chemicals. With a little effort a landowner can ensure that these animals remain a part of our outdoor heritage.

Toads and frogs provide food for a wide variety of animals, are also eaten by people—frog legs are a delicacy—and their peeps, trills, whistles, grunts and snores add aesthetics to a spring or summer evening. The study of these interesting amphibians can be a rewarding summer-time hobby. Learning to identify the species by the sounds they make can be an enjoyable spring and sum-

mer pastime and is as challenging as birdwatching. As the famous herpetologist Archie Carr once wrote: "I collect frog songs in my head as some people save stamps in a book." You don't have to be a trained zoologist to be able to recognize their various sounds; it just takes practice and a lot of patience. □

Small, shallow, fishless ponds are important breeding ponds for many toads, frogs and salamanders.

